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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/711,918
Filing Date: October 13, 2004
Appellant(s): TARVIN ET AL.

____
Robert A. Van Someren
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06/15/09 appealing from the Office action mailed 01/26/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

NEW GROUND(S) OF REJECTION

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

Claim 27, dependent upon dependent claim 25, which is dependent from independent claim 22, was listed on the Office Action summary of the action mailed 01/26/09 as rejected. The rejection of claim 27, however, was inadvertently omitted

from the body of the action. Claim 27 is rejected under 35 USC 103(a) as unpatentable over Brown (WO 01/05481) in view of C.K. Woodrow (SPE/IADC 67729).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

C.K. Woodrow (SPE/IADC 67729), Brown (WO 01/04581), Foster (US 3,275,980), Van Bemmel et al. (US 6,201,884), Charske et al. (US 2,938,592), Brune et al. (US 6,756,783), Tubel (US 6,012,015)

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by C.K. Woodrow (SPE/IADC 67729).

With respect to independent claim 1, Woodrow discloses a method for analyzing distributed temperature data from a well, comprising: using a distributed temperature sensor system to obtain temperature profile data along a portion of a well bore; providing the temperature profile data to a processor; automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data; and highlighting valuable information to a user related to the flow of fluid relative to the tubing (see entire document, especially sections **Principles of Operation**, **How it was deployed in Term Alpha Well A-27**, **Observed thermal profile during well kick-off**).

With respect to depending claim 21, the reference discloses wherein automatically determining occurs in real-time with the obtaining of data (**Observed thermal profile during well kick-off**, paragraph 4).

Claims 1, 6-8, 14, 21-26, 29, 31, 34-38, 46, and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Brown.

With respect to independent claim 1, Brown discloses a method for analyzing distributed temperature data from a well comprising: using a distributed temperature sensor system to obtain temperature profile data along a portion of a well bore; providing the temperature profile data to a processor; automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data; and highlighting valuable information to a user related to the flow of fluid relative to the tubing (see entire disclosure, esp. p. 12, l. 27 – p. 16, l. 27).

With respect to depending claims 6-8, Brown discloses wherein automatically determining comprises applying a model-fitting algorithm to the data, and, further, wherein applying a model-fitting algorithm comprises selecting regions for fitting and fitting a model to data, wherein applying a model-fitting algorithm further comprises testing results for statistical significance (p. 9, l. 25 –p. 11, l. 5).

With respect to depending claim 14, Brown discloses wherein using comprises obtaining the temperature profile data with a temporary distributed temperature sensor installation (col. 13, l. 23-24).

With respect to depending claim 21, the reference discloses the automatically determining occurring in real-time (p. 4, l. 1-4; p. 11, l. 1-3; p. 16, l. 21-22).

With respect to independent claim 22, Brown discloses a system to analyze distributed temperature data from a well, comprising: a distributed temperature sensor that measures temperature profile data along a portion of a well bore; a processor that receives the temperature profile data in real time, the processor being programmed to identify a particular temperature signal that corresponds to a specific down hole event having an inflow of relatively cooler fluid; and wherein the processor outputs valuable information related to a specific down hole event to a user (see entire disclosure, esp. p. 12, l. 27 – p. 16, l. 27).

With respect to depending claims 23-26, and 29, the reference teaches wherein the distributed temperature system comprises an optical fiber, wherein the distributed temperature sensor comprises an opto-electronic unit to launch optical pulses downhole, wherein the opto-electronic unit is coupled to the processor by a communication link, wherein the communication link comprises a hardline link, and a production tubing deployed in the wellbore with the optical fiber (p. 3, l. 1-6; p. 7, l. 11-29; p. 12, l. 27 - p. 13, l. 28).

With respect to independent claim 31, Brown discloses a method of detecting certain events within a well, comprising: using a distributed temperature sensor system to obtain data related to temperature over a period of time along a portion of a well bore; automatically processing the data to detect specific events related to heat energy in the

well; further automatically processing the data to determine a flow rate of fluid in the well; and displaying results to a user (see esp. p. 12, l. 27 – p. 16, l. 27).

With respect to depending claims 34-38, the reference discloses automatically processing comprising processing the data on a processor-based computer, processing backscattered light signals, applying a model-fitting algorithm to the data, selecting regions for fitting and fitting a model to data, and testing for statistical significance (p. 3, l. 1-25; p. 7, l. 11 – p. 13, l. 28).

With respect to depending claim 46, Brown discloses displaying the results in graphical form on a display monitor (Fig. 2).

With respect to depending claim 48, the reference discloses the automatically determining occurring in real-time (p. 4, l. 1-4; p. 11, l. 1-3; p. 16, l. 21-22).

Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow as applied to claim 1 above, and further in view of Foster.

Woodrow discloses the method as stated above with respect to independent claim 1, and, further, wherein the temperature data can be displayed on-site, stored for later analysis or transmitted in real-time via modem or scada/modbus links to office based engineers and can then be interpreted using appropriate software applications. The reference, however, fails to explicitly disclose wherein automatically determining comprises removing noise from the temperature profile data as claimed in depending claim 2, as well as wherein automatically determining comprises utilizing a low-pass filter as claimed in depending claim 5.

Foster teaches a method for improving the resolution of geophysical data for the purpose of rendering the data more representative of a measured characteristic within a subsurface earth formation (col. 1, l. 9-39). Within the method, Foster teaches a noise removal system that takes the form of a low-pass filter for the purpose of removing noise spikes; the reference further teaches that noise must be removed prior to processing of the data, otherwise error will be introduced to the data (col. 4, l. 29-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to remove noise from the data obtained within the method of Woodrow, and, further, to utilize a low-pass filter in doing so, in order to obtain the most representative data of the measured characteristic, the distributed temperature, within the method of Woodrow, thereby eliminating extraneous and erroneous measurements obtained therein.

Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow as applied to claim 1 above, and further in view of Van Bemmel et al..

Woodrow discloses the method as stated above with respect to independent claim 1, and, further, wherein the temperature data can be displayed on-site, stored for later analysis or transmitted in real-time via modem or scada/modbus links to office based engineers and can then be interpreted using appropriate software applications. The reference, however, fails to explicitly disclose wherein automatically determining comprises removing low order spatial trends as claimed within claim 3 and the trend removal and filtering of the temperature profile data as claimed in claim 11.

Van Bemmel et al. teaches a method and apparatus for testing a large plurality of displayed data points of recorded spatial data for the purpose of determining and displaying trends created by different sets of data points within the recorded spatial data (abstract); the reference further provides for the teaching of employing the system within the field of oil exploration, wherein the spatial data obtained may be processed to find trends in the data (col. 24, l. 55-62). The reference further teaches the removal of trend lines displayed in the data (col. 25, l. 47-51). Although the reference does not explicitly state the removal of low order spatial trends, it would have been obvious to one having ordinary skill in the art to remove the those trends within the spatial data that are least indicative of the overall data trends therein, so as to obtain a more accurate data profile; therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to remove low order spatial trends as taught by Van Bemmel et al. within the field of oil exploration, and, therefore, to try such a removal of low order spatial trends, thereby filtering the data, within the method of Woodrow in order to yield the predictable result of providing the most representative temperature data within the well bore to be processed and used in highlighting valuable information to a user.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow as applied to claim 1 above, and further in view of Charske et al..

Woodrow discloses the method as stated above with respect to independent claim 1, and, further, wherein the temperature data can be displayed on-site, stored for later analysis or transmitted in real-time via modem or scada/modbus links to office

based engineers and can then be interpreted using appropriate software applications. The reference, however, fails to explicitly disclose wherein automatically determining comprises utilizing a high-pass filter.

Charske et al. teaches a method of obtaining data as a function of depth within a well bore (col. 1, l. 15-22) wherein the data signals are subjected to high-pass filtering for the purpose of attenuating sharply signal components having a frequency over that which is desired, thereby eliminating the response of the succeeding interval timing circuit to undesired low frequency noises unavoidably created within the well bore (col. 7, l. 5-23). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a high-pass filter within the method of Woodrow in order to eliminate any extraneous and erroneous measurements, and, thereby provide the most representative data indicative of the distributed temperature profile of the well bore.

Claims 6-9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow as applied to claim 1 above, and further in view of Brown.

Woodrow discloses the method with respect to independent claim 1 as stated above, and, further, wherein "The full implications of the tremendous temperature fluctuations observed in the annulus of TA-27 have yet to be fully understood as we have not yet established a thermal model that can accurately match the observed temperature profile had yet to be obtained" (p. 3, col. 2, paragraph 2). Woodrow further discloses future plans for additional thermal modeling study work utilizing commercially

available software leading to direct gas-lift and general well optimization in real time (p. 4). The reference, however, fails to explicitly teach wherein the automatically determining comprises applying a model-fitting algorithm to the data, and, further, wherein applying a model-fitting algorithm comprises selecting regions for fitting and fitting a model to data, further, wherein applying a model-fitting algorithm comprises testing results for statistical significance for the purpose of obtaining valuable information indicative of fluid flow relative to the tubing in the well bore, and, wherein applying a model-fitting algorithm comprises constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths as claimed.

Brown teaches a distributed temperature system within a well bore wherein a model-fitting algorithm is applied to the data, wherein applying the model-fitting algorithm comprises selecting regions for fitting and fitting a model to data, and, further, wherein applying a model-fitting algorithm comprises testing results for statistical significance for the purpose of obtaining valuable information indicative of fluid flow relative to the tubing in the well bore (see esp. p. 10-11). Since Woodrow discloses that the full implications of the data obtained therein had not yet been understood since a thermal model was yet to be established and Brown teaches the value of applying a model-fitting algorithm to the data, it would have been obvious to one having ordinary skill in the art at the time the invention was made to apply a model-fitting algorithm to the data obtained within the method of Woodrow as taught by Brown in order to provide one of ordinary skill with additional valuable information pertaining to the well and flow of fluids therein that can be used to enhance further operations therein.

With respect to depending claim 9, the combination is silent to the application of a model-fitting algorithm comprising constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths. The Examiner hereby takes Official Notice in that it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct a match filter and to use extrema of a convolution of the filter with data to select candidate depths in order to enhance the model-fitting algorithm obtained therefrom.

With respect to depending claim 14, Woodrow fails to explicitly teach installation of a temporary distributed temperature sensor installation. Brown teaches the installation of sensors within a well as either permanently installed or conveyed into a measuring location by wireline (p. 2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the sensors of Woodrow as part of a temporary installation within those environments in which a permanent installation of the distributed temperature sensor system therein is not desired.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow.

Woodrow discloses the method with respect to independent claim 1 as stated above wherein the deployment method for the optical fibre distributed temperature system can be within the control line, externally on the outside of tubing, or run in and out of the well using typical wireline techniques (see **Principle of Operation**). The

aforementioned section fails to explicitly disclose the wireline technique wherein the temperature profile data is obtained with a slickline distributed temperature sensing system. Woodrow, however, teaches prior art temperature measuring techniques wherein temperature is measured using production logging tools, run on slickline or electric line, and/or coiled tubing, for the purpose of continuously monitoring the wellhead temperature (see **Background**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to deploy the optical fibre distributed temperature system using a “typical” wireline technique such as a slickline for the purpose of continuously obtaining temperature data.

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow as applied to claim 1 above, and further in view of Brune et al..

Woodrow discloses the method as stated above with respect to independent claim 1, wherein temperature signals corresponding to particular downhole events, such as the location of a gas lift valve, a hole in a tubing, and a leak in a well bore completion tool, is detected. Woodrow further discloses future plans for additional thermal modeling study work utilizing commercially available software leading to direct gaslift and general well optimization in real time (p. 4). The reference, however, fails to teach wherein automatically determining comprises utilizing a match filter, and further, wherein the match filter detects particular the temperature signals corresponding to the particular down hole events provided above.

Brune et al. teaches the use of a match filter for interpreting data that is used within a locating system for the purpose of providing a far less computationally complex approach to interpreting data signals, that, although described for use within drilling systems, is taught to enjoy wide application that is in no way limited to use in only drilling systems (col. 26, l. 35 – col. 28, l. 7; col. 31, l. 61-col. 32, l. 9). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide for optimization within the method of Woodrow wherein particular downhole events, such as the location of a gas lift valve, a hole in a tubing, and a leak in a well bore completion tool, can be detected, by employing a match filter therein so as to provide a more efficient means to interpret the data that is less complex.

Claims 10 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodrow in view of Brown and Brune et al..

With respect to independent claim 10, Woodrow discloses a method for analyzing distributed temperature data from a well, comprising: obtaining temperature profile data along a portion of a well bore; providing the temperature profile data to a processor; and automatically processing the temperature profile data to highlight valuable information to a user.

With respect to independent claim 40, Woodrow discloses a method of detecting certain events within a well, comprising: obtaining data over a period of time along a portion of a well bore; automatically processing the data to detect specific events related to heat energy in the well; and displaying results to a user (see entire document,

especially sections **Principles of Operation**, **How it was deployed in Term Alpha Well A-27**, **Observed thermal profile during well kick-off**).

Woodrow further discloses wherein “The full implications of the tremendous temperature fluctuations observed in the annulus of TA-27 have yet to be fully understood as we have not yet established a thermal model that can accurately match the observed temperature profile had yet to be obtained” (p. 3, col. 2, paragraph 2) and that future plans for additional thermal modeling study work utilizing commercially available software leading to direct gaslift and general well optimization in real time (p. 4). The reference, however, fails to explicitly teach wherein the automatically determining comprises applying a model-fitting algorithm to the data as claimed within both claims 10 and 40.

Brown teaches a distributed temperature system within a well bore wherein a model-fitting algorithm is applied to the data, for the purpose of obtaining valuable information indicative of fluid flow relative to the tubing in the well bore (see esp. p. 10-11). Since Woodrow discloses that the full implications of the data obtained therein had not yet been understood since a thermal model was yet to be established and Brown teaches the value of applying a model-fitting algorithm to the data, it would have been obvious to one having ordinary skill in the art at the time the invention was made to apply a model-fitting algorithm to the data obtained within the method of Woodrow as taught by Brown in order to provide one of ordinary skill with additional valuable information pertaining to the well and flow of fluids therein that can be used to enhance further operations therein.

Although Brown teaches various calibration of data within application and determination of the model fitting algorithm, the combination of Woodrow in view of Brown is silent to the construction of a match filter, and, further, wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends.

Brune et al. teaches the use of a match filter for interpreting data that is used within a locating system for the purpose of providing a far less computationally complex approach to interpreting data signals, that, although described for use within drilling systems, is taught to enjoy wide application that is in no way limited to use in only drilling systems (col. 26, l. 35 – col. 28, l. 7; col. 31, l. 61-col. 32, l. 9). The reference further provides for a calibration procedure wherein orthogonal axes can be located and data obtained can be transformed mathematically into any desired direction (col. 15, l. 15-40). Since Brown teaches calibration within application of the model-fitting algorithm, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide for a match filter as taught by Brune et al. to interpret the data signals within the application of a model-fitting algorithm of Woodrow in view of Brown, and further, to provide for the incorporation of modifications into the filter to make it orthogonal to background trends in order to provide calibration therein.

Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to claim 1 above, and further in view of Foster.

Brown discloses the method as stated above with respect to independent claim 1, and, further, wherein multiple measurements of at a plurality of locations may be made so that the results art not critically dependent upon one set of data. The reference, however, fails to explicitly disclose wherein automatically determining comprises removing noise from the temperature profile data as claimed in depending claim 2, as well as wherein automatically determining comprises utilizing a low-pass filter as claimed in depending claim 5.

Foster teaches a method for improving the resolution of geophysical data for the purpose of rendering the data more representative of a measured characteristic within a subsurface earth formation (col. 1, l. 9-39). Within the method, Foster teaches a noise removal system that takes the form of a low-pass filter for the purpose of removing noise spikes; the reference further teaches that noise must be removed prior to processing of the data, otherwise error will be introduced to the data (col. 4, l. 29-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to remove noise from the data obtained within the method of Brown, and, further, to utilize a low-pass filter in doing so, in order to obtain the most representative data of the measured characteristics therein, the distributed temperature, thereby eliminating extraneous and erroneous measurements that would inaccurately depict the conditions within the well bore.

Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to claim 1 above, and further in view of Van Bemmel et al..

Brown discloses the method as stated above with respect to independent claim 1, and, further, wherein multiple measurements of at a plurality of locations may be made so that the results art not critically dependent upon one set of data. The reference further provides for a calibration period, as well as application of an algorithm and least squares regression fit of the data. The reference, however, fails to explicitly disclose wherein automatically determining comprises removing low order spatial trends within the data as claimed within claim 3 and the trend removal and filtering of the temperature profile data as claimed in claim 11.

Van Bemmel et al. teaches a method and apparatus for testing a large plurality of displayed data points of recorded spatial data for the purpose of determining and displaying trends created by different sets of data points within the recorded spatial data (abstract); the reference further provides for the teaching of employing the system within the field of oil exploration, wherein the spatial data obtained may be processed to find trends in the data (col. 24, l. 55-62). The reference further teaches the removal of trend lines displayed in the data (col. 25, l. 47-51). Although Van Bemmel et al. does not explicitly state the removal of low order spatial trends, it would have been obvious to one having ordinary skill in the art to remove the those trends within the spatial data that are least indicative of the overall data trends therein, so as to obtain a more accurate data profile; therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to remove low order spatial trends as taught by Van Bemmel et al. within the field of oil exploration, and, therefore, to try such a removal of low order spatial trends, thereby filtering the data, within the method of Brown in order

to yield the predictable result of providing the most representative data within the well bore to be processed and used in highlighting valuable information to a user.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to claim 1 above, and further in view of Charske et al..

Brown discloses the method as stated above with respect to independent claim 1, and, further, wherein multiple measurements of at a plurality of locations may be made so that the results art not critically dependent upon one set of data. The reference, however, fails to explicitly disclose wherein automatically determining comprises utilizing a high-pass filter.

Charske et al. teaches a method of obtaining data as a function of depth within a well bore (col. 1, l. 15-22) wherein the data signals are subjected to high-pass filtering for the purpose of attenuating sharply signal components having a frequency over that which is desired, thereby eliminating the response of the succeeding interval timing circuit to undesired low frequency noises unavoidably created within the well bore (col. 7, l. 5-23). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a high-pass filter within the method of Brown in order to eliminate any extraneous and erroneous measurements, and, thereby provide the most representative data indicative of the distributed temperature profile of the well bore.

Claims 9, 15, 28, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown.

With respect to depending claim 9 and 39, Brown is silent to the application of a model-fitting algorithm comprising constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths. The Examiner hereby takes Official Notice in that it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct a match filter and to use extrema of a convolution of the filter with data to select candidate depths in order to enhance the model-fitting algorithm obtained therefrom.

With respect to depending claim 15, Brown is silent to the obtainment of the temperature profile data with a slickline distributed temperature sensing system. The Examiner hereby takes Official Notice in that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a slickline distributed temperature sensing system insofar as because the use of a slickline to deploy temperature sensing equipment is well known within the art.

With respect to depending claim 28, although Brown discloses the use of a data processing unit at the well site, the reference fails to explicitly teach the processor as a portable computer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a portable computer for the processor in order to use the computer at a different location upon completion of the deployment of the distributed temperature system within the well in which the system is initially used.

Claims 16-20 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to claims 1 and 31 above, and further in view of Brune et al..

Brown teaches the method as stated above with respect to independent claims 1 and 31 wherein the data obtained is calibrated and temperature signals corresponding to particular downhole events corresponding to fluid flow within producing oil, water, and gas wells, wherein the data can be used to adjust or improve flow rates, to diagnose immediate or potential problems, or to trigger alarms (p. 1, l. 15-20). The reference, however, fails to teach wherein automatically determining comprises utilizing a match filter, and further, wherein the match filter detects particular the temperature signals corresponding to particular down hole events.

Brune et al. teaches the use of a match filter for interpreting data that is used within a locating system for the purpose of providing a far less computationally complex approach to interpreting data signals, that, although described for use within drilling systems, is taught to enjoy wide application that is in no way limited to use in only drilling systems (col. 26, l. 35 – col. 28, l. 7; col. 31, l. 61-col. 32, l. 9). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide for optimization within the method of Brown wherein particular downhole events that may be used to adjust or improve flow rates, to diagnose immediate or potential problems, or to trigger alarms, such as the location of a gas lift valve, a hole in a tubing, and a leak in a well bore completion tool, by employing a match filter therein so as to provide a more efficient means to interpret the data.

Claims 30 and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to claims 22, 23, 29, and 31 above, and further in view of Woodrow.

With respect to depending claim 30, Brown discloses the use of system within producing oil, water and gas wells (p. 7, l. 24-28). The reference further provides for the use of the obtained data to actively adjust or improve flow rate, to diagnose immediate or potential problems, or to trigger alarms (p. 1, l. 15-20). The reference, however, fails to explicitly teach the production tubing combined with a gas lift system as claimed in depending claim 30, as well as wherein automatically processing comprises detecting the location of a gas lift valve, a well completion tool leak, and a hole in a production tubing as claimed in claims 43-45. Woodrow teaches the use of a distributed temperature system within a gas lift system for the purpose of determining the opening and closing of gaslift valves which can be seen through the Joule Thomson effect of gas passing through the valves. The reference further provides for the use of distributed temperature data as having potential to detect a leak quickly and accurately. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the production tubing of Brown in combination with a gas lift system in order to determine the passage of gas therethrough, as well as to use the data obtained from the system of Brown to actively diagnose immediate or potential problems such as the location of a gas lift valve, a well bore completion tool leak, or a hole in production tubing insofar as because as taught by Woodrow, it is known within

the art to detect such problems using distributed temperature data, and the method of Brown can be used to promptly remediate such problems.

Claims 10 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown in view of Brune et al..

With respect to independent claim 10, Brown discloses a method for analyzing distributed temperature data from a well, comprising: obtaining temperature profile data along a portion of a well bore; providing the temperature profile data to a processor; and automatically processing the temperature profile data to highlight valuable information to a user.

With respect to independent claim 40, Brown discloses a method of detecting certain events within a well, comprising: obtaining data over a period of time along a portion of a well bore; automatically processing the data to detect specific events related to heat energy in the well; and displaying results to a user (see entire disclosure, esp. p. 12, l. 27 – p. 16, l. 27).

Although Brown teaches various calibration of data within application and determination of the model fitting algorithm, the reference is silent to the construction of a match filter, and, further, wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends.

Brune et al. teaches the use of a match filter for interpreting data that is used within a locating system for the purpose of providing a far less computationally complex approach to interpreting data signals, that, although described for use within drilling

systems, is taught to enjoy wide application that is in no way limited to use in only drilling systems (col. 26, l. 35 – col. 28, l. 7; col. 31, l. 61-col. 32, l. 9). The reference further provides for a calibration procedure wherein orthogonal axes can be located and data obtained can be transformed mathematically into any desired direction (col. 15, l. 15-40). Since Brown teaches calibration within application of the model-fitting algorithm, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide for a match filter as taught by Brune et al. to interpret the data signals within the application of a model-fitting algorithm, and further, to provide for the incorporation of modifications into the filter to make it orthogonal to background trends in order to provide the calibration therein.

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to claim 31 above, and, further, in view of Tubel.

Brown discloses the method with respect to claim 31 as stated above wherein a model may be applied to the data. The reference, however, fails to teach automatically processing comprising applying a phenomenological model to the data. Tubel teaches a downhole production well control system in which sensors are employed, and, wherein models, such as phenomenological models, are employed for the purpose of combining knowledge obtained from the system with a model for the purpose of obtaining optimum operating parameters for the process and improving the performance therein (see col. 6, lines 25-57). Therefore, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to look to a phenomenological model to enhance the modeling techniques employed by Brown.

NEW GROUND(S) OF REJECTION

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown as applied to independent claim 22 and dependent claim 24 above, and, further, in view of C.K. Woodrow.

With respect to depending claim 27, Brown discloses wherein the distributed temperature system comprises an opto-electronic unit to launch optical pulses downhole (see page 3, line 1 – page 4, line 4; page 12, line 27-page 13, line 28). Therein, the reference teaches wherein an optical fibre deployment of the tube is connected with surface mounted instrumentation that includes a data processing apparatus that serves as a means for interpreting temperature and location related characteristics with respect to the temperature profile of the well. The reference, however, fails to explicitly teach wherein the communication link coupling the opto-electronic unit to the processor is wireless as claimed in dependent claim 27.

C.K. Woodrow teaches the use of an optical fiber distributed temperature system to provide a measure of temperature in a well bore wherein the fiber is connected to an analysis computer; the temperature data is taught to be capable of being processed and displayed on-site or transmitted in real-time via modem or scada/modbus links, thereby providing a wireless communication link, to office based engineers for the purpose of further interpretation using appropriate software applications (see **Principle of**

Operation section). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide for a wireless communication link to couple the opto-electronic unit to the processor disclosed by Brown as an alternative to a hardline link coupling the opto-electronic unit to the processor at the well site in order to transmit the data to a location remote from the well site for further analysis and interpretations using appropriate software applications.

(10) Response to Argument

With respect to the rejection of claims 1 and 21 as unpatentable under 35 USC 102(b) as anticipated by Woodrow, Appellant presents independent claim 1 was improperly rejected insofar as because the reference fails to disclose or suggest "automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data." The Examiner disagrees. Woodrow discloses the processing of data, wherein "raw" data extracted from the distributed temperature system is processed so as to generate a graph displaying the thermal profile of the well bore and the various thermal profiles of the well bore obtained following initial kick-off (Figure 4). Woodrow teaches on page 3, second column, first paragraph, "These profiles clearly show the gas-lift valves opening and closing, and the significant Joule Thomson effect of the gas passing through the operating valve." The "clear" showing of the gas-lift valves opening and closing is indicated by the peaks in the data points, for example, at 2,640 meters in Figure 4. Those of ordinary skill in the art, therefore, would clearly and instantaneously recognize (and, thereby, "automatically

determine") that gas is passing through the operating valve at 2,640 meters when seeing the peak in processed/graphed temperature profile at a well depth of 2,640 meters. The Examiner would like to note that the limitation of "automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile" as presently written does not require that it is the processor (in the form of a computer) that "automatically determines whether fluids are flowing into or out of the tubing located in the well." Therefore, one of ordinary skill looking at the processed/graphed temperature profile data and noticing the "clear showing" of gas passing through the operating valve by recognition of the peaks in the data as gas passing through the operating valve anticipates the "automatic determination" of whether fluids are flowing into or out of a tubing.

Appellant further presents that Woodrow fails to disclose or suggest "highlighting valuable information to a user related to the flow of fluid relative to the tubing." Appellant notes that the graph in Figure 4 is manually interpreted by an engineer as showing the gas lift valves opening and closing, and further, that none of the information is highlighted or indicated on the graph. The Examiner disagrees. As noted above, those of ordinary skill in the art can look at the processed temperature profile and would clearly and instantaneously recognize and, thereby, "automatically determine" that gas is passing through the operating valve at 2,640 meters when seeing the peak in processed/graphed temperature profile at a well depth of 2,640 meters. As a result, the valuable information of the flow of gas passing through the operating valve would be highlighted to the user. The Examiner would like to further note that although Appellant

presents that the Woodrow system requires human intervention and that if human intervention is required, determination is not automatic, as noted by the Examiner in the directly pre-ceding paragraph one of ordinary skill looking at the processed/graphed temperature profile data and noticing the “clear showing” of gas passing through the operating valve by recognition of the peaks in the data as gas passing through the operating valve anticipates the “automatic determination” of whether fluids are flowing into or out of a tubing.

Appellant presents that claim 21 depends from independent claim 1 and recites additional elements; it is Appellant’s position that the present rejection of claim 21 also is unsupported. As noted above, the rejection of independent claim 1 under 35 USC 102(b) is maintained, and, therefore, the rejection of dependent claim 21 stands.

With respect to the rejection of claims 1, 6-8, 14, 21-26, 29, 31, 34-38, 46 and 48 as unpatentable under 35 USC 102(b) as anticipated by Brown, Appellant presents that Brown fails to disclose or suggest “automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data" insofar as because Appellant is unable to locate any disclosure or teaching in the Brown reference in which the temperature data is processed for automatically determining whether fluids are flowing into or out of a tubing. The Examiner disagrees. Brown discloses a method wherein distributed temperature data is obtained from a well employing a fiber optic sensor system wherein a distributed temperature profile of fluids flowing along the length of the tubing is obtained and employed so as to highlight the

mass flow rate of the fluid to the user (see abstract). On page 12, beginning at line 27, Brown discloses a data processing unit included within a surface instrumentation as providing a means for interpreting temperature and location related characteristics of emergent light in terms of the temperature profile of the optical fiber at a series of locations along the well, thereby providing a means to process the data. Further information regarding the data processing unit begins on page 16, line 19, wherein Brown discloses that the data processing unit as providing real time information, which is coupled with the application of thermal analytical techniques to temperature data derived from the optical fibre distributed temperature sensors to provide continuous real-time mass flow data. The reference further notes on page 3, line 28 - page 4, line 4 that the mass flow rates obtained in employing the disclosed method and system are of those of produced fluids (fluids flowing into a tubing); therefore, in processing the temperature data as disclosed by Brown, one of ordinary skill can automatically determine if fluids are flowing into a tubing located in the well as based on the mass flow rate determined for any fluid flow therein. For example, if in processing the temperature profile data no mass flow rate is determined, an automatic determination of no fluid flow into the well bore can be made.

Appellant further notes that Brown fails to disclose or suggest “highlighting valuable information to a user related to the flow of fluid relative to the tubing.” The Examiner disagrees. On page 16, lines 17-27, Brown discloses the method and system as used to provide continuous real-time mass flow data and notes that such data can be

used in many ways to enhance oil well management, therefore, anticipating "highlighting valuable information to a user related to the flow of fluid relative to the tubing."

Appellant presents that claims 6-8 and 21 ultimately depend from independent claim 1 and recite additional elements; accordingly, it is Appellant's position that the rejections of claims 6-8 and 21 under 35 USC 102(b) are also unsupported and should be withdrawn. As provided above, Brown anticipates the limitations of independent claim 1, and, therefore, the rejection of dependent claims 6-8 and 21 stands.

Appellant presents that the Brown reference fails to disclose obtaining the temperature profile data with a “temporary” distributed sensor installation as recited in dependent claim 14 and notes the Examiner's citing of page 13, lines 23-24 as previously cited for disclosing this limitation. The Examiner maintains the position that the Brown disclosure on page 13, lines 23-24 of deploying and replacing the fiber within a deployment tube anticipates a "temporary" installation insofar as because in replacing the fiber within the system of Brown, the initially deployed fiber is not permanently installed, thereby rendering the deployment of the initially deployed fiber “temporary.”

Appellant presents with respect to independent claim 22 that the Brown reference fails to disclose or teach a "processor being programmed to identify a particular temperature signal that corresponds to a specific downhole event” and, therefore, there is no disclosure or suggestion that "the processor outputs valuable information related to the specific downhole event to a user" as further recited. As noted above within the response to the remarks made regarding the rejection of claim 1, the disclosed data processing apparatus identifies a temperature signal that

corresponds to the downhole event of produced fluid flow within a well bore (see page 3, line 28 – page 4, line 4). On page 16, lines 17-27, Brown discloses that the system provides continuous real-time mass flow data and notes that such data can be used in many ways to enhance oil well management, thereby, anticipating "the processor outputs valuable information related to the specific downhole event to a user."

Appellant presents that claims 23-26 and 29 ultimately depend from claim 22 and recite additional elements; accordingly, it is Appellant's position that the rejections of claims 23-26 and 29 under 35 USC 102(b) are also unsupported and should be withdrawn. As provided above, Brown anticipates the limitations of independent claim 22, and, therefore, the rejection of dependent claims 23-26 and 29 stands.

Appellant presents that Brown also fails to disclose each and every element of independent claim 31. It is Appellant's position that the Brown reference fails to disclose or suggest "automatically processing the data to detect specific events related to heat energy in the well" and "further automatically processing the data to determine a flow rate of fluid in the well." Appellant notes that using changes in temperature of fluid as it flows through the lengths of conduit disposed through massive underground formations having natural temperatures is substantially different than automatically processing the data to detect specific events related to heat energy in the well. The Examiner disagrees. Brown discloses a method wherein distributed temperature data is obtained from a well employing a fiber optic sensor system wherein a distributed temperature profile of fluids flowing along the length of the tubing is obtained and used so as to highlight the flow of produced fluids from the well. On page 12, line 27, Brown

discloses a data processing unit included within the surface instrumentation means coupled to the opto-electronic unit that provides a distributed temperature profile of fluids flowing along the length of conduit; therefore the processing of the obtained data to provide a distributed temperature profile anticipates "automatically processing data to detect specific events (i.e., the general flow of fluids as they are produced along a length of conduit) related to heat energy (i.e., the temperature along the length of the conduit) in the well." Further information regarding the data processing unit begins on page 16, line 19, wherein Brown discloses that the data processing unit provides real time information, which is coupled with the application of thermal analytical techniques to temperature data derived from the optical fibre distributed temperature sensors to provide continuous real-time mass flow data. The reference further notes on page 3, line 28 - page 4, line 4 that the mass flow rates obtained in employing the disclosed method and system are of those of produced fluids; therefore, in processing the temperature data as disclosed by Brown, one of ordinary skill can further automatically determine if fluids are flowing into a tubing located in the well as based on the mass flow rate determined for any fluid flow therein. For example, if in processing the temperature profile data no mass flow rate is determined, an automatic determination of no fluid flow into the well bore can be made.

Appellant presents that claims 34-38, 46, and 48 ultimately depend from independent claim 31 and recite additional elements; accordingly, it is Appellant's position that the rejections of claims 34-38, 46, and 48 under 35 USC 102(b) are also

unsupported and should be withdrawn. As provided above, Brown anticipates the limitations of claim 31, and, therefore, the rejections of claims 34-38, 46, and 48 stand.

Appellant presents that claims 2 and 5 were improperly rejected as obvious over Woodrow in view of Foster insofar as because claims 2 and 5 depend directly from independent claim 1 and are patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejections of claims 2 and 5 stand.

Appellant presents that claims 3 and 11 were improperly rejected as obvious over Woodrow in view of Van Bemmel et al. insofar as because claims 3 and 11 depend directly from independent claim 1 and are patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejections of claims 3 and 11 stand.

Appellant presents that claim 4 was improperly rejected as obvious over Woodrow in view of Charske et al. insofar as because claim 4 depends directly from independent claim 1 and is patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent

claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejection of claim 4 stands.

Appellant presents that claims 6-9 and 14 were improperly rejected as obvious over Woodrow in view of Brown insofar as because claims 6-9 and 14 depend directly from independent claim 1 and are patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejections of claims 6-9 and 14 stand.

Appellant presents that claim 15 was improperly rejected as obvious over Woodrow insofar as because claim 15 depends directly from independent claim 1 and is patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejection of claim 15 stands.

Appellant presents that claims 16-20 were improperly rejected as obvious over Woodrow in view of Brune et al. insofar as because claims 16-20 depend directly from independent claim 1 and are patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent

claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejections of claims 16-20 stand.

Appellant presents that independent claims 10 and 40 were improperly rejected under 35 USC 103(a) over Woodrow in view of Brown and Brune et al. Appellant presents that as previously discussed, Woodrow and Brown fail to disclose or teach automatically processing data to detect specific events related to heat energy in a well as recited in independent claim 40. The Examiner disagrees. Woodrow discloses the "automatic processing" of data upon retrieval of the data from the well bore, wherein data extracted from the distributed temperature system is "processed" to generate a graph displaying the thermal profile of the well bore and the various thermal profiles obtained following initial kick-off (Figure 4). As noted by Woodrow on page 3, second column, first paragraph, "These profiles clearly show the gas-lift valves opening and closing, and the significant Joule Thomson effect of the gas passing through the operating valve." Therefore, the generation of the temperature profile of the well upon obtaining the distributed temperature data therefrom anticipates "automatically processing the data (i.e., converting the distributed temperature data values obtained at various well depths to a temperature profile in the form of a graph) to detect specific events (i.e., the opening and closing of the gaslift valves) related to heat energy (i.e., the Joule Thomson effect of the gas passing through the operating valve) in the well." Appellant further presents that according to the January 26, 2009 action, Woodrow "fails to explicitly teach wherein the automatically determining comprises applying a model-

fitting algorithm to the data as claimed within both claims 10 and 40," that the Brown reference is characterized as "silent to the construction of a match filter, and, further, wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends," and that Brune et al. is cited and relied on as providing "a calibration procedure wherein orthogonal axes can be located and data obtained can be transformed mathematically into any desired direction." Appellant expresses a strong disagreement of the characterization of the cited references and further traverses the rejection on the grounds that Brune describes a field detector used in a system for operating a boring tool that cannot be construed as disclosing, teaching or suggesting automatically processing a temperature profile through application of a model-fitting algorithm by "constructing a match filter, further wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends" as recited in independent claim 10 or as automatically processing data on specific events related to heat energy in a well by applying a model-fitting algorithm that comprises "constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths, wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends" as recited in claim 40. The Examiner would like to note that although Applicant presents that the field detector disclosed by Brune et al. is used in a system for operating a boring tool, as cited in the January 26, 2009 office action, Brune teaches that the disclosed match filter configuration enjoys wide application that is in no way limited to use in drilling systems (col. 32, lines 5-9). Therefore, Brune teaches

"constructing a match filter, further wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends." As further noted within the action, the Brune reference teaches use of the match filter to interpret data used within a locating system in a well. The Examiner would like to note that the distributed temperature sensor system disclosed by Woodrow is used to provide temperature data at various locations along a well bore. As further noted within the action, Brune teaches the match filter used for the purpose of providing a less computationally complex approach to interpreting data signals. Therefore, since Woodrow discloses the processing of temperature data, and, as noted in the action, in view of Brown teaches calibration within application of a model-fitting algorithm to temperature data, the Examiner maintains that it would have been obvious to one having ordinary skill in the art to provide for a match filter as taught by Brune et al. to interpret the data so as to incorporate modifications into the filter in order to provide calibration of the processed data. Appellant further notes disagreement with the characterization of the Woodrow and Brown references and submits that the disparate teachings of Woodrow and Brown relative to Brune et al. render the combination of references improper under 35 USC 103(a). Appellant notes that since the cited references fail to disclose or suggest elements of the subject claims, Appellant believes it is unnecessary to discuss whether the references have been properly combined. The Examiner would like to note that as provided above, the cited references disclose and/or suggest the elements of the subject claims. As further noted above, Brune teaches that the disclosed match filter configuration used in a locating system for the purpose of

providing a far less computationally complex approach to interpreting data signals, enjoys wide application that is in no way limited to use in drilling systems within subterranean formations. The distributed temperature data systems disclosed by Woodrow and Brown can be considered “locating” systems in the sense that the systems disclosed by both references are used in obtaining a distributed temperature profile along the length of a well bore, thereby "locating" various temperature data along the well. Furthermore, the Brune reference teaches the use of the match filter in interpretation of the obtained well bore data wherein the interpretation thereof is rendered less computationally complex. Therefore, the combination of such a filter within the data interpretation systems disclosed and/or taught by Woodrow and Brown would improve upon data interpretation without the inclusion of a match filter.

Appellant presents that claims 2 and 5 were improperly rejected as obvious over Brown in view of Foster insofar as because claims 2 and 5 depend directly from independent claim 1 and are patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Brown, and, therefore, the rejections of claims 2 and 5 stand.

Appellant presents that claims 3 and 11 were improperly rejected as obvious over Brown in view of Van Bemmel et al. insofar as because claims 3 and 11 depend directly from independent claim 1 and are patentable for the reasons provided above

with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Brown, and, therefore, the rejections of claims 3 and 11 stand.

Appellant presents that claim 4 was improperly rejected as obvious over Brown in view of Charske et al. insofar as because claim 4 depends directly from independent claim 1 and is patentable for the reasons provided above with respect to claim 1 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claim 1 stands rejected under 35 USC 102(b) as anticipated by Brown, and, therefore, the rejection of claim 4 stands.

Appellant presents that claims 9, 15, 28, and 39 were improperly rejected as obvious over Brown insofar as because claims 9, 15, 28, and 39 depend directly from independent claims 1, 22, or 31 and are patentable for the reasons provided above with respect to claims 1, 22, and 31 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claims 1, 22, and 31 stand rejected under 35 USC 102(b) as anticipated by Woodrow, and, therefore, the rejections of claims 9, 15, 28, and 39 stand.

Appellant presents that claims 16-20 and 47 were improperly rejected as obvious over Brown in view of Brune et al. insofar as because claims 16-20 depend directly from independent claims 1 or 31 and are patentable for the reasons provided above with

respect to claims 1 and 31 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claims 1 and 31 stand rejected under 35 USC 102(b) as anticipated by Brown; therefore, the rejections of claims 16-20 stand.

Appellant presents that claims 30 and 43-45 were improperly rejected as obvious over Brown in view of Woodrow. insofar as because claims 30 and 43-45 depend directly from independent claims 22 or 31 and are patentable for the reasons provided above with respect to claims 22 and 31 as well as for the additional unique subject matter recited in the dependent claims. As provided above, claims 22 and 31 stand rejected under 35 USC 102(b) as anticipated by Brown, and, therefore, the rejections of claims 30 and 43-45 stand.

Appellant presents that independent claims 10 and 40 were improperly rejected under 35 USC 103(a) over Brown in view of Brune et al. Appellant presents that as previously discussed, Brown fails to disclose or teach automatically processing data to detect specific events related to heat energy in a well as recited in independent claim 40. The Examiner disagrees. Brown discloses a method wherein distributed temperature data is obtained from a well employing a fiber optic sensor system wherein a distributed temperature profile of fluids flowing along the length of the tubing is obtained and used so as to highlight the flow of produced fluids from the well. On page 12, line 27, Brown discloses a data processing unit included within the surface instrumentation means that provides a distributed temperature profile of fluids flowing

along a length of conduit; therefore the processing of the data to provide a distributed temperature profile anticipates "automatically processing data to detect specific events (i.e., the general flow of fluids as they are produced along a length of conduit) related to heat energy (i.e., the temperature along the length of the conduit) in the well." Appellant further presents that Brune et al. fails to obviate the deficiencies of disclosure with respect to the Brown reference and notes that the combination further fails to disclose, teach or suggest various elements of independent claim 10 or independent claim 40. Appellant presents that according to the January 26, 2009 action, the Brown reference is characterized as "silent to the construction of a match filter, and, further, wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends," and that Brune et al. is cited and relied on to provide these elements. Appellant expresses a strong disagreement of the characterization of the cited references and further traverses the rejection on the grounds that Brune describes a field detector used in a system for operating a boring tool that cannot be construed as disclosing, teaching or suggesting automatically processing a temperature profile through application of a model-fitting algorithm by "constructing a match filter, further wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends" as recited in independent claim 10 or as automatically processing data on specific events related to heat energy in a well by applying a model-fitting algorithm that comprises "constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths, wherein constructing the match filter comprises incorporating modifications to the filter to make it

orthogonal to background trends" as recited in claim 40. The Examiner would like to note that although Applicant presents that the field detector disclosed by Brune et al. is used in a system for operating a boring tool, as cited in the January 26, 2009 office action, Brune teaches that the disclosed match filter configuration enjoys wide application that is in no way limited to use in drilling systems (col. 32, lines 5-9). Therefore, Brune teaches "constructing a match filter, further wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends." As further noted within the action, the Brune reference teaches use of the match filter to interpret data used within a locating system in a well. The Examiner would like to note that the distributed temperature sensor system disclosed by Brown is used to provide temperature data at various locations along a well bore. As further noted within the action, Brune teaches the match filter used for the purpose of providing a less computationally complex approach to interpreting data signals. Therefore, the Examiner maintains that it would have been obvious to one having ordinary skill in the art to provide for a match filter as taught by Brune et al. to interpret the data so as to incorporate modifications into the filter in order to provide calibration of the processed data of Brown. Appellant further notes disagreement with the characterization of the Brown reference and submits that the disparate teachings of Brown relative to Brune et al. render the combination of references improper under 35 USC 103(a). Appellant notes that since the cited references fail to disclose or suggest elements of the subject claims, Appellant believes it is unnecessary to discuss whether the references have been properly combined. The Examiner would like to note that as

provided above, the cited references disclose and/or suggest the elements of the subject claims. As further noted above, Brune teaches that the disclosed match filter configuration used in a locating system for the purpose of providing a far less computationally complex approach to interpreting data signals, enjoys wide application that is in no way limited to use in drilling systems within subterranean formations. The distributed temperature data systems disclosed by Brown can be considered “locating” systems in the sense that the systems disclosed by both references are used in obtaining a distributed temperature profile along the length of a well bore, thereby "locating" various temperature data along the well. Furthermore, the Brune reference teaches the use of the match filter in interpretation of the obtained well bore data wherein the interpretation thereof is rendered less computationally complex. Therefore, the combination of such a filter within the data interpretation systems disclosed by Brown would improve upon data interpretation without the inclusion of a match filter.

Appellant presents that claim 41 was improperly rejected as obvious over Brown in view of Tubel et al. insofar as because claim 41 depends directly from independent claim 31 and is patentable for the reasons provided above with respect to claims 31 as well as for the additional unique subject matter recited in the dependent claim. As provided above, claim 31 stands rejected under 35 USC 102(b) as anticipated by Brown, and, therefore, the rejections of claim 41 stands.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Angela M DiTrani/

Examiner, Art Unit 3676

/Jennifer H Gay/

Supervisory Patent Examiner, Art Unit 3676

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/Frederick R Schmidt/

Director Technology Center 3600

Conferees:

Marc Jimenez /MJ/

Jennifer H Gay /JHG/